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Advisory Circular

Subject:	**PART 121, 125, AND 135 FLIGHTCREW PROCEDURES DURING TAXI OPERATIONS**	**Date: x/x/xx**		**AC No:**	**120-XX**
		Initiated by:	**AFS-200**	**Change:**	

1. PURPOSE. This advisory circular (AC) provides guidelines for the development and implementation of standard operating procedures for conducting safe aircraft operations during taxiing. It is intended for use by persons operating aircraft under parts 121, 125, and 135 (those part 135 flight operations where two or more pilots are in the cockpit) of Title 14 of the Code of Federal Regulations (14 CFR). The Federal Aviation Administration (FAA) recommends that these guidelines become an integral part of all standard operating procedures, flight operations manuals, and formal flight crewmember training programs. The use of flightcrew procedures should be emphasized and employed during all phases of a flight crewmember's aircraft ground and flight training programs.

> **NOTE: Persons operating aircraft under 14 CFR part 91 general operating and flight rules and for part 135 flight operations where only 1 pilot is in the cockpit, refer to AC 91-XX, Part 91 Pilot and Flightcrew Procedures During Taxi Operations and Part 135 Single-Pilot Operations.**

2. FOCUS. This guidance focuses on the activities occurring within the cockpit (e.g., planning, communicating, coordinating), as opposed to the actual control of the aircraft (e.g., steering, maneuvering). Taxi operations present distinct challenges and requirements not found in other phases of flight operations. These distinct challenges are elaborated, when necessary, throughout the guidance. An additional section is provided concerning operations at airports without operating control towers. Finally, a section is included on the use of exterior aircraft lights during ground operations which make an aircraft more conspicuous to other flightcrews.

3. RELATED READING MATERIAL.

a. Aeronautical Information Manual (AIM)

b. AC 90-42, Traffic Advisory Practices at Airports Without Operating Control Towers

c. AC 90-66, Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports Without Operating Control Towers

d. AC 120-57A, Surface Movement Guidance and Control System

4. BACKGROUND. In the past, the process of getting to and from the runway was relatively simple compared to other phases of flight, and little attention was given to formalizing flightcrew procedures during taxi operations. Also, formal training for flight deck procedures during airport surface operations has been inconsistent between organizations, and frequently received inadequate attention. As a result, a variety of procedures and techniques evolved primarily based on what flight crewmembers have observed or what just seemed right at the time. This lack of structure, standardization, and formal training is inconsistent with the goal of increasing the safety and efficiency of aircraft movement on the airport surface.

a. Recently, increases in traffic and expansion at many airports have created complex runway and taxiway layouts. This has made airport surface operations more difficult and potentially more hazardous than they were in the past. To increase safety and efficiency, it is necessary to lessen the exposure to hazards and risks by holding the flightcrew's workload to a minimum during taxi operations. This can be accomplished through procedures that allow the flightcrew to be prepared to devote their attention to only essential tasks while the aircraft is in motion. This requires the development and formalized teaching of safe operating procedures during taxi operations.

b. In developing procedures, it is important to consider existing flight crewmember workload prior to take off and before landing. Considerations should be given to some of the tasks that make up the normal workload of all flightcrews, such as accomplishing checklists, configuring the aircraft for takeoff and landing, programming Flight Management Systems and managing communications with the carrier and Air Traffic Control (ATC). The more complex the activities within the cockpit work environment, the greater is the need for formal and standardized procedures. The overall goal is for the carriers to develop standardized flightcrew procedures that will increase the flightcrew's awareness but will not increase their workload while the aircraft is taxiing.

5. FLIGHTCREW PROCEDURES.

a. General. The potential for runway incidents and accidents can be reduced through adequate planning, coordination, and communication. The following guidelines are intended to help flightcrews cope more effectively with current airport conditions during taxi operations. All flight crewmembers, regardless of whether they are designated as the pilot in command (PIC), second in command (SIC), or the flight engineer (FE), will benefit from this guidance. The guidelines are grouped into six major categories: Planning, Situational Awareness, Use of Written Taxi Instructions, Intra-cockpit Verbal Coordination, ATC/Pilot Communication, and Taxiing.

b. Planning.

(1) Thorough planning for taxi operations is essential for a safe operation. Flightcrews should give as much attention to the planning of the airport surface movement portion of the flight as they give to the planning of the other phases of flight. Make planning for taxi operations an integral part of the flightcrew's flight planning process. Planning should be done

in two main phases. First, anticipate airport surface movements by doing pre-taxi or pre-landing planning based on information on the automatic terminal information service (ATIS) and on previous experience at that airport. Second, once taxi instructions are received, the pre-landing or pre-taxi plans should be reviewed and updated as necessary. It is essential that the updated plan is understood by all flight crewmembers.

CAUTION: A potential pitfall of pre-taxi and pre-landing planning is setting expectations and then receiving different instructions from ATC. Flightcrews need to ensure that they follow the clearance or instructions that are actually received, and not the one the flightcrew expected to receive.

(2) The following guidance should be used to conduct a briefing of all flight crewmembers.

(a) How familiar are the flight crewmembers with the airport? Has anyone flown out of or into the airport recently? Might there have been changes made at the airport recently? Remember to review the latest Notices to Airmen (NOTAM) for both the departure and arrival airports for information concerning construction and/or taxiway/runway closures.

(b) Take some time and study the airport layout. An airport diagram must be readily available for use by the pilots. Check the expected taxi route against the airport diagram or taxi chart. Pay special attention to any unique or complex intersections along the taxi route. While planning for departure, be sure to consider the likely inbound taxi route at the arrival airport as well. Flightcrews should identify critical times and locations on the taxi route (transitioning through complex intersections, crossing intervening runways, entering and lining up on the runway for takeoff, and approaching and lining up on the runway for landing) where verbal coordination between the PIC and the SIC will be important to ensure correct aircraft navigation and crew orientation.

(c) The flightcrew should plan the timing and execution of aircraft checklists and company communications at the appropriate times and locations so the pilot who is not taxiing the aircraft can be available to participate in verbal coordination with the pilot who is taxiing the aircraft. This action is needed to confirm compliance with ATC taxi instructions at the appropriate times and locations. When planning these tasks, flightcrews should also consider the anticipated duration of the taxi operation, the locations of complex intersections and runway crossings, and the visibility along the taxi route. If at all possible, during low visibility operations flightcrews should only conduct pre-departure checklists when the aircraft is stopped.

c. Situational Awareness.

(1) When conducting taxi operations, flightcrews need to be aware of their situation as it relates to other aircraft operations going on around them as well as to other vehicles moving on the airport. The flightcrew should know the aircraft's precise location on the airport. Sometimes, this is a challenge, especially when flightcrews are at an unfamiliar airport, the airport layout and taxi routes are complex, or the visibility is poor. It is important for the flightcrew to understand and follow ATC instructions and clearances, to have and use an airport

diagram, and to know and use all of the visual aids available at the airport, such as the signs, markings, and lighting, when taxiing on the airport.

(2) Flightcrews should use a "continuous loop" process for actively monitoring and updating their progress and location during taxi. This includes knowing the aircraft's present location and mentally calculating the next location on the route that will require increased attention. For example, a turn onto another taxiway, an intersecting runway, or any other transition points. As the "continuous loop" is updated, flight crewmembers should verbally share relevant information with each other.

(a) Situational awareness is enhanced by monitoring ATC instructions/clearances issued to other aircraft.

(b) Prior to entering or crossing any runway, scan the full length of the runway, including approach areas. Flight crewmembers should verbally confirm scan results with each other and aircraft movement should be stopped if there is any difference or confusion on the part of any flight crewmember about the scan results.

CAUTION: Do not stop on a runway. If possible, taxi off the runway and then initiate communications with ATC to regain orientation.

(c) Be especially vigilant when instructed to taxi into position and hold, particularly at night or during periods of reduced visibility. Do not remain in position and hold on the departure runway for an extended period without direct communication from ATC. If any flight crewmember is uncertain about any ATC instruction or clearance, query ATC immediately. If anyone suspects radio problems, observe the tower for light gun signals.

(d) Use extra caution when directed to use a runway as a taxiway, especially during reduced visibility conditions.

(e) Use the utmost caution after landing on a runway that intersects another runway or on a runway where the exit taxiway will shortly intersect another runway. All flight crewmembers must have a common understanding of ATC's instructions and expectations regarding where the aircraft is to stop and must be able to identify the appropriate hold points. Immediately advise ATC if there is any uncertainty about the ability to comply with any of their instructions.

CAUTIONS: 1. After landing, when you are on an exit taxiway that is between parallel runways, taxi your aircraft clear of the landing runway unless you are constrained by a hold-short line associated with the adjacent parallel runway.

2. Unless otherwise instructed by ATC, taxi clear of the landing runway even if that requires you to cross or enter a taxiway/ramp area.

3. At an airport with an operating air traffic control tower, never enter a runway without specific authorization. When in doubt, contact ATC.

4. At a non-towered airport or at an airport where the control tower is closed, listen on the appropriate frequency (CTAF) for inbound aircraft information and scan the full length of the runway, including the final approach and departure paths, before entering or crossing the runway. Remember that not all aircraft are radio equipped.

NOTE: For more information about operations at non-towered airports, refer to the current versions of AC 90-42, Traffic Advisory Practices at Airports Without Operating Control Towers, and AC 90-66, Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports without Operating Control Towers.

(f) After landing and exiting the runway, nonessential communications and nonessential flightcrew actions should not be initiated until clear (on the inbound side) of all runways.

d. Use of Written Taxi Instructions. At many airports, taxi instructions can be very complex, involving numerous turns and transitions, as well as runway crossing and hold short instructions. During these airport surface operations, pilots are very busy with a variety of cockpit duties and responsibilities that compete for their attention. Misunderstanding or forgetting any part of the taxi instructions can lead to an embarrassing or unsafe situation. Writing down taxi instructions, especially complex instructions, can reduce a pilot's vulnerability to forgetting part of a complex instruction and can be used to support airport surface operations as follows:

(1) For use as a reference for reading back the instructions to ATC.

(2) For crewmember coordination on the assigned runway and taxi route.

(3) For a short pre-taxi or pre-landing briefing on the pending airport surface operation.

(4) As a means of reconfirming the taxi route and any restrictions at any time during the airport surface operation without the need to call ATC for a repeat or clarification.

NOTE: While written taxi instructions are a good operating technique, common sense and flexibility should be used in determining the crew's need for them at a specific airport. For example, if the departure runway is very near the aircraft parking location, or if the crew has used the same taxi route numerous times in the previous days, it may only be necessary to record the basic elements of the taxi clearance. However, where the taxi instructions are complex or the crew in unfamiliar with the airport layout, a verbatim transcription of all instructions is desirable. Additionally, individual pilots

may chose to develop a set of symbols and shorthand notations which allow them to clearly record and later recall key items in the taxi instructions.

e. Intra-flight deck/cockpit Verbal Coordination. It is essential that the flightcrew correctly understand and agree on all ATC ground movement instructions. Any misunderstanding or disagreement should be resolved to the satisfaction of all flight crewmembers before taxiing the aircraft. **It is the verbal aspect of this coordination that is most significant.** It is not enough to assume that all flight crewmembers have heard and understood instructions correctly. A common understanding can be enhanced by one flight crewmember repeating the instructions verbally and getting agreement on the content and intent from the other flight crewmember(s). When flight crewmembers verbally confirm their understanding of the instructions, they then have a chance to discover and correct any misunderstandings and thus prevent hazardous situations from developing. This verbal coordination/agreement should be accomplished:

(1) When ATC issues taxi instructions for a departure, the flightcrew should refer to the airport diagram, coordinate verbally, and agree on the assigned runway and taxi route, including any instructions to hold short of or cross an intersecting runway.

(2) When ATC issues landing instructions, the flightcrew should coordinate verbally and agree on the runway assigned by ATC, as well as any restrictions, such as hold short points of an intersecting runway after landing.

(3) After landing and exiting the runway, the flightcrew should coordinate verbally and agree on the ATC taxi instructions to the aircraft's parking area, including any instructions to hold short of or cross an intersecting runway.

(4) At complex intersections, the flightcrew should verbally coordinate to be sure that the intersection is correctly identified and that the aircraft is transitioning through the intersection to the correct taxiway.

(5) When approaching an intersecting runway, the flightcrew should verbally coordinate in order to identify the runway. They should also verbally review the ATC instructions as to whether they are to hold short of or cross the runway.

(6) Before crossing any runway or entering a runway for takeoff or for landing, both pilots should visually scan to the left and to the right, including the full length of the runway and its approach paths, and coordinate verbally that the scan area is or is not clear.

(7) Before entering a runway for takeoff, the flightcrew should verbally coordinate to ensure correct identification of the runway and receipt of the proper ATC clearance to use it. Similar verification should be performed during approach to landing.

(8) When it becomes necessary for a flight crewmember to stop monitoring any ATC frequency, he or she should tell the other flight crewmember(s) when stopping and resuming the monitoring of the ATC frequency. Any instructions or information received or transmitted

during that flight crewmember's absence from the ATC frequency should be briefed and reviewed upon his or her return.

(9) When the pilot not taxiing the aircraft focuses his or her attention on instruments in the cockpit, such as entering data into the aircraft's Flight Management System, and, consequently, is not able to visually monitor the aircraft's progress, he or she should verbally notify the pilot taxiing the aircraft. Likewise, notification should be made when that flight crewmember has completed his or her task and is again able to visually monitor the taxi operation.

f. ATC/Flightcrew Communication. The primary way the flightcrew and ATC communicate is by voice. The safety and efficiency of taxi operations at airports with operating control towers depend on this "communication loop." Controllers use standard phraseology and require readbacks and other responses from the flightcrew in order to ensure that clearances and instructions are understood. In order to complete the "communication loop," the controllers must also clearly understand the flightcrew's read back and other responses. The flightcrew can help enhance the controller's understanding by responding appropriately and using standard phraseology. Regulatory requirements, the AIM, approved flight crewmember training programs, and operational manuals provide information for flightcrews on standard ATC phraseology and communications requirements. Some of the most important guidelines that contribute to clear and accurate communications are included here.

(1) Maintain a "sterile" cockpit. Flight crewmembers must be able to focus on their duties without being distracted by non-flight related matters, such as eating meals, engaging in non-essential conversation, or reading material not related to the safe and proper operation of the aircraft. When operating an aircraft that does not have a door between the flightdeck and the passenger compartment, the pilot may need to ask passengers to refrain from unnecessary conversation from the time the pre-flight preparations begin until the time the aircraft is clear of the terminal area and at cruising altitude. The same procedure should be followed on arrival, from the time landing preparations begin until the aircraft is safely stopped at the terminal.

(2) Use standard ATC phraseology at all times in order to facilitate clear and concise ATC/flightcrew communications.

(3) Focus on what ATC is instructing. Do not perform any non-essential tasks while communicating with ATC.

(4) Readback all hold short and runway crossing instructions and clearances, including the runway designator.

NOTE: Air traffic controllers are required to obtain from the pilot a readback of all runway hold short instructions.

(5) Readback all takeoff and landing clearances, including the runway designator.

(6) Clarify any misunderstanding or confusion concerning ATC instructions or clearances to the satisfaction of all flight crewmembers.

g. Taxiing. This paragraph will not discuss speed management, steering, or maneuvering the aircraft, but will suggest some good practices regarding other cockpit activities during taxi.

(1) Prior to taxiing, a copy of the airport diagram should be available for use by the flightcrew.

> **NOTE: A flight crewmember -- other than the pilot taxiing the aircraft -- should follow the aircraft's progress on the airport diagram to ensure that the instructions received from ATC are being followed by the pilot taxiing the aircraft.**

(2) The aircraft's compass or heading display is an excellent tool, as a supplement to visual orientation, for confirming correct taxiway or runway alignment. Refer to it as frequently as necessary, but especially at complex intersections and where the takeoff ends of two runways are close to one another.

(3) Low visibility conditions increase the challenge of safely moving the aircraft on the airport surface. Although visibility is technically designated as "low" when the runway visual range (RVR) falls below 1200 feet, visibility along the taxi route may be considerably less than the runway visibility. Use all resources available, including heading indicators, airport signs, markings and lighting, and airport diagrams to the fullest extent possible in order to keep the aircraft on its assigned taxi route.

(4) Anytime the flightcrew becomes uncertain as to the aircraft's location on the airport movement area, stop the aircraft and immediately advise ATC. If necessary, request progressive taxi instructions. The flightcrew should give ATC any information available about their position, such as signs, markings, and landmarks.

> **CAUTION: Do not stop on a runway. If possible, taxi off the runway and then initiate communications with ATC to regain orientation.**

(5) When cleared to takeoff, or to cross a runway, or when exiting a runway, do so in a timely manner. Inform ATC of any anticipated delay.

(6) After landing, **do not** exit onto another runway without prior ATC authorization.

6. POLICIES AND PROCEDURES FOR TAXI OPERATIONS AT NON-TOWERED AIRPORTS AND AIRPORTS WHERE THE CONTROL TOWER IS CLOSED.

> **NOTE: For more information about operations at non-towered airports, refer to the current versions of AC 90-42, Traffic Advisory Practices at Airports Without Operating Control Towers, and AC 90-66,**

Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports without Operating Control Towers.

a. General. The absence of an operating airport traffic control tower creates a need for increased vigilance on the part of the flightcrew operating at those airports. There are also specific communications procedures that differ from those used at airports with control towers. Planning, clear communications, and enhanced situational awareness during airport surface operations will reduce the potential for surface incidents at airports without an operating control tower. This section will focus on those aspects of taxi operations that are unique to airports without an operating control tower and will not repeat in detail information covered in other sections of this AC.

b. Planning.

(1) Planning taxi operations at an airport without an operating control tower is similar to planning taxi operations at an airport with an operating tower. However, flightcrews must remember that some airports have part-time operational control towers. When planning to fly into or out of such an airport, be absolutely certain of the tower's operational status before conducting any operations. If in doubt, attempt contact on the tower's frequency.

(2) When planning for taxi at an airport without an operating control tower, consider the following:

(a) How familiar are you with the airport? Have you flown out of or into that airport recently? Might there have been changes made at the airport since your last flight? Remember to review the latest Notices to Airmen (NOTAM) for both departure and arrival airports for information concerning construction and/or taxiway/runway closures.

(b) Take some time to study the airport layout. Use an airport diagram to plan your taxi. Pay special attention to any tricky or complex intersections along the route. While planning for departure, be sure to consider the likely inbound taxi route at your arrival airport as well.

(c) Familiarize yourself with the local traffic pattern. Remember, not all airports use a standard traffic pattern. Don't forget to check the pattern altitude.

CAUTION: During calm or nearly calm wind conditions, be aware that flight operations may occur at more than one runway at the airport. Also, aircraft may be utilizing an instrument approach procedure to runways other than the runway in use for VFR operations. The instrument approach runway may intersect the VFR runway.

(d) Familiarize yourself with the local common traffic advisory frequency (CTAF) or Unicom frequency.

(e) Brief you taxi plans and be sure all flight crewmembers have a common understanding of the plan.

c. Situational awareness. While maintaining situational awareness is important in all circumstances, it is particularly important when operating at an airport without an operating control tower. To achieve situational awareness, the flightcrew should be fully aware of their intended taxi route and be able to follow the planned route correctly. Without ATC to verbally assist or tell the flightcrew where and when to stop, the flightcrew must rely on visual cues to maintain situational awareness and maintain the planned taxi route. These visual cues include airport signs, markings, and lighting, together with the airport diagram. These particular cues are especially useful during periods of poor visibility and at night. Other things to consider that can help you maintain situational awareness while operating at an airport without a working control tower:

(1) Monitor the appropriate frequency. Listen to what the pilots of other aircraft on the frequency are saying on the radio.

(2) If possible, monitor the approach control frequency to alert you to IFR traffic inbound to the airport.

(3) Prior to entering or crossing any runway, scan the full length of the runway, including approach areas. **Do not** engage in any other flight deck/cockpit duties while crossing a runway. Give your full attention to crossing and clearing the runway.

(4) Use exterior lighting to make your aircraft more conspicuous to other pilots. Use of exterior lighting is discussed further in paragraph 7 of this circular.

d. Communication and Aeronautical Data. Communication rules and guidelines and aeronautical data for operations at airports without an operating control tower differ from those applicable at towered airports. Various regulations, the AIM, approved flightcrew-training programs, and operational procedure manuals provide information to the flightcrew on standard phraseology, communication, and data requirements.

(1) Before Taxi.

(a) Ensure that current aeronautical data for the airport is obtained including the operating hours and status of the control tower.

(b) Ensure airport communication facilities or aids are monitored by a flight crewmember, i.e., CTAF, flight service station (FSS), or Unicom frequency.

(2) Taxi for Departure.

(a) Monitor the CTAF, FSS, or Unicom frequency.

NOTE: Flightcrews of departing aircraft should monitor/communicate on the appropriate frequency from engine start, during taxi, and until 10 miles from the airport unless appropriate regulations, local procedures, or operations specifications require otherwise.

(b) The flightcrew should self-announce all ground movement operations on the CTAF, FSS, or Unicom frequency.

(3) Taking the Runway.

(a) The flightcrew should self-announce their intention to take off on the CTAF, FSS or Unicom frequency.

(b) Do not line up on the departure runway and hold any longer than absolutely necessary.

(c) Always state the name of the airport at the beginning and end of the radio transmission.

CAUTION: Some aircraft operating at airports without operating control towers may not be equipped with a radio. Flightcrews must remain alert for them.

7. USE OF EXTERIOR AIRCRAFT LIGHTS TO MAKE AIRCRAFT MORE CONSPICUOUS.

a. General.

(1) Exterior aircraft lights may be used to make an aircraft operating on the airport surface more conspicuous. Pilots may use various combinations of exterior lights to convey their location and intent to other pilots. Certain exterior lights may also be used in various combinations to signal whether the aircraft is on a taxiway or on a runway, in position on the runway but holding for takeoff clearance, crossing an active runway, or moving down the runway for takeoff.

(2) Because adherence to the guidelines in this AC are voluntary and aircraft equipment varies, flightcrews are cautioned not to rely solely on the status of an aircraft's lights to determine the intentions of the flightcrew of the other aircraft. Additionally, flightcrews must remember to comply with operating limitations on the aircraft's lighting systems.

b. Exterior Lights. To the extent possible and consistent with aircraft equipage, operating limitations, and flightcrew procedures, illuminate exterior lights as follows:

(1) Engines running. Turn on the **rotating beacon** whenever an engine is running.

(2) Taxiing. Prior to commencing taxi, turn on **navigation, position, anti-collision, and logo lights**. Strobe lights should not be illuminated during taxi if they will adversely affect the vision of other pilots or ground personnel.

(3) Crossing a runway. **All exterior lights** should be illuminated when crossing a runway.

(4) Entering the departure runway for takeoff. When entering a runway to takeoff, or when taxiing into position and holding for takeoff, illuminate **one or more landing lights and all other exterior lights**. Strobe lights should not be illuminated if they will adversely affect the vision of other pilots.

(5) Takeoff. Turn on **all remaining landing lights** when takeoff clearance is received, or when commencing takeoff roll at an airport without an operating control tower.

8. SUMMARY. Taxi operations require constant vigilance on the part of the entire flightcrew, not just the pilot taxiing the aircraft. The flightcrew needs to be continually aware of the movement and location of other aircraft and ground vehicles on the airport movement area. Taxi operations require the same planning, coordination, and proper execution, as do the other phases of flight operations. Safe aircraft operations can be accomplished and incidents eliminated if the flightcrew is properly trained and correctly accomplishes standard taxi operating procedures and practices.

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